Physical Chemistry-Properties of Gases

Name of a student ---------------------- Signature ---------------------- No. ----

University of Mustansiriyah 1st Semester-2021

Department of Chemistry 1st Exam-paper A

Q1: Circle the right answer for all of the following:

1: A vessel of 50 mL capacity contains a certain amount of gas at 40 °C and 2 bar pressure. The gas is transferred to another vessel of volume 100 mL at 40 °C. What should be it is pressure?

Answer: **a) 1.0 atm b) 0.85 mmHg c) 0.9 cmHg d) 1 bar**

2: What is the right formula of the Van der Waals equation?

Answer: **a)** $p = [nRT/(V-nb)] - n(a^2/V^2)$ **b)** $P = [nRT/(V-nb)] - V(n^2/a^2)$ **c)** $p = [nRT/(b-nV)] - a(n^2/V^2)$ **d)** $P = [nRT/(V-nb)] - a(n^2/V^2)$

3: Calculate the temperature of 4.0 mol of a gas occupying 5.0 dm^3 at 3.3 bar?

Answer: **a) 50.3 °C b) 48 K c) 51 °C d) 50.3 K**

4: Calculate the weight of O_2 (32 $g.mol^{-1}$) in a 4 L cylinder at 9 atm and 281 K.

Answer: **a) 50 kg b) 50 g c) 50 K d) 50 °C**

5: Calculate the p_C of He gas, if the p_r and p is 0.44 and 1 atm respectively

Answer: **a) 2.26 K b) 2.26 atm c) 2.26 L d) 2.26 mol**

6: If the repulsion forces are negligible, that means the gas is?

Answer: **a) real b) noble c) perfect d) compressed**

7: According to the Dalton's law total mole fraction is equal to?

Answer: **a) 0.10 mol b) 1.0 mol c) 0.10 d) 1.0**

8: What is the partial pressure of a gas in a mixture if the X_i is 0.5, and the conditions are at STP?

Answer: **a) 1.5 Pa b) 0.49 bar c) 0.5 atm d) 0.5 bar**

9: If the value of is 0.082 then the unit of temperature is?

Answer: **a) Kelvin b) Celsius c) Fahrenheit d) no one of these**

10: According to the Avogadro's law the amount of a gas at STP is?

Answer: **a) 1.00 mol b) 2.00 mol c) 1.00 L d) 2.00 mol**

Q2: The air inside a flexible 3.5 L container has a pressure of 115 kPa. What should the volume of the container be increased to in order to decrease the pressure to 625 torr?

Q3: A 3 dm^3 container holds 0.5 moles of N_2 gas at 42 °C. What is the pressure inside the container?

12/01/2021 **Best wishes** **Dr Abduljabbar I. R. Rushdi**

Q2 $\frac{P_1}{P_2} = \frac{V_{12}}{V_{21}}$

$\frac{115}{625} = \frac{3.5}{V_2}$

$115 V_2 = 2187.5$

$V_2 = \frac{2187.5}{115}$

$= 19.02\ L$

Q2 5/25

Q3 $PV = nRT$

$0.03L * V = 0.5\ mol * 0.082\ mol.L/atm.k * 315\ k$

$V = \frac{0.5\ mol * 0.082\ mol.L/atm.k * 315\ k}{0.03\ L}$

$V = 430.5$ liter

Q3 5/25